INL scientist receives award for contributions to cancer treatment research

The International Society for Neutron Capture Therapy (ISNCT) awarded David Nigg of Idaho National Laboratory (INL) the Hatanaka Award at the 12th International Symposium on Neutron Capture Therapy held Oct. 8-12 in Takamatsu, Japan. The Hatanaka Award is presented every two years by ISNCT in recognition of sustained leadership and research contributions in the field of neutron capture therapy.

Boron Neutron Capture Therapy (BNCT) has commanded the attention of scientists worldwide for a number of years as a promising experimental treatment for an essentially lethal form of brain cancer and certain other malignancies.

Scientists at INL have been researching BNCT techniques for about 20 years, said Nigg, who has overseen the BNCT research at INL since 1994, when Merle Griebenow, who initiated the INL program, retired. Research at INL in neutron dosimetry and neutron source engineering, biophysics, radiobiology and boron chemistry has added significantly to the pool of knowledge surrounding neutron capture therapy.

Nigg attributes the Hatanaka award to the INL team of scientists, its numerous national and international collaborations, its students and collaborating universities, and visiting scientists from all over the world who have spent time at INL on various occasions.

Advanced treatment planning software is a significant outcome of ongoing INL research.

"I view it more as recognition for INL," he said. "There's been a very strong team of people here. It's very nice to be recognized as an individual, but it's more important to know that it's been a team effort."

The award is named for Dr. Hiroshi Hatanaka, an internationally recognized and respected pioneer in neutron capture therapy, said Jim Lake, INL associate laboratory director.

"It's an honor for INL and for Dave to be recognized with the Hatanaka award for his personal contributions in the area of analytical radiation dosimetry," Lake said.

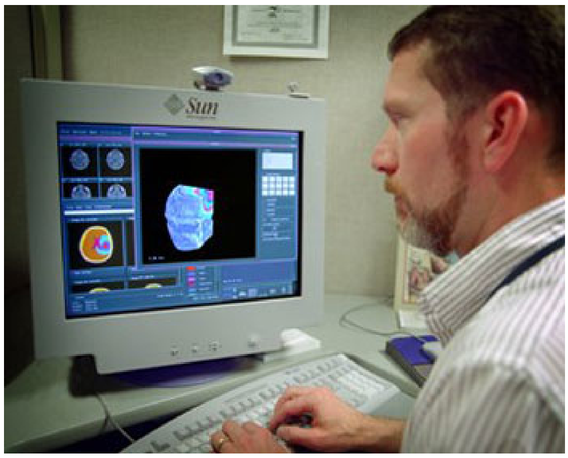
"I am very proud of Dave Nigg's achievements in the neutron capture therapy field," said Ronaldo Szilard, director of the Nuclear Science & Engineering Division of INL's Nuclear Programs. "Dave is an important member of an outstanding team which has brought international recognition to INL in this area. Furthermore, an award of such stature as the Hatanaka Award is an awesome accomplishment and further enhances the laboratory commitment to excellence in the nuclear area. My congratulations to Dave for this important achievement in his career."

Even with the best of modern medical treatment, Glioblastoma Multiforme kills roughly 90 percent of all patients who contract it within two years. The most malignant type of brain tumor, it stems from unknown causes, is resistant to conventional radiation therapy and chemotherapy and is so prolific that surgery is rarely effective. Developing a way to treat it successfully poses a major challenge for today's scientists.

But research is showing that by localizing high doses of radiation, BNCT may ultimately be able to offer some new hope. One of the two naturally-occurring isotopes of boron, boron-10, has a high tendency to absorb neutrons. By attaching isotopically separated boron-10 to a biochemical agent that has an affinity for cancerous tissue, it can be ideally delivered through the blood straight to cancerous cells. When that area is exposed to a beam of neutrons, the boron-carrying cancer cells are exposed to high radiation doses and are killed. Healthy tissue ideally receives a significantly lower radiation dose.

"When a neutron collides with a boron atom, an alpha particle and a lithium ion are produced," said Nigg. "These highly energetic charged particles won't travel farther than the width of a cell, leading to selective destruction of the tumor and sparing the neighboring normal tissue."

BNCT is thus similar to molecular targeted radioisotope therapy but with the potential added advantage of an "on-off" switch to control the healthy tissue dose.



Physicists use dosimetry software to advance neutron capture therapy.

INL scientists, engineers and technicians contributing to the project have included Floyd Wheeler (deceased), Richard Wiersema (deceased), Dan Wessol, Carol Cise, Dave Miller, Bill Bauer, Dan Ginosar, Anita Gianotto, Kyle Burch, Linda Polson, Ken Watts, John Zabriskie, John Ryskamp, Christine White, James Jones, Byron White, Chuck Wemple, Jim Venhuizen, Jack Hartwell, Josh Cogliati, Mike Milvich, Yale Harker, Pete Randolph, and Cecilia Hoffman, as well as Doug Speirs and the staff of the INL Prototype Shop.

Collaborating universities, DOE laboratories and international organizations have included Washington State University, Montana State University, Idaho State University, UCLA, UC-Davis, UC-Berkeley, Massachusetts Institute of Technology, the University of Washington, Georgia Institute of Technology, Brookhaven National Laboratory, Lawrence Berkeley National Laboratory, Lawrence Livermore National Laboratory, Fermi National Accelerator Laboratory, The Technical Research Centre of Finland, the Australian Nuclear Science and Technology Organisation, the Commission of the European Communities Joint Research Centre at Petten (Netherlands), Studsvik (Swedish National Laboratory), the University of Essen (Germany), Kyoto University (Japan), the Institute of Physics and Power Engineering (Russia) and, most recently, the National Atomic Energy Commission of Argentina via the U.S. Department of Energy Sister Laboratory program.

General Contact:
Teri Ehresman, (208) 521-9882,

Feature Archive